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GENERAL INFORMATION

Coal Mine Fatal Accident 2003-20



Operator:	Highland Mining Co.
Mine:	Highland 9 Mine
Accident Date:	July 2, 2003
Classification:	Machinery
Location:	District 10, Union Co., Kentucky
Mine Type:	Underground
Employment:	229
Production	12,000 tons/day

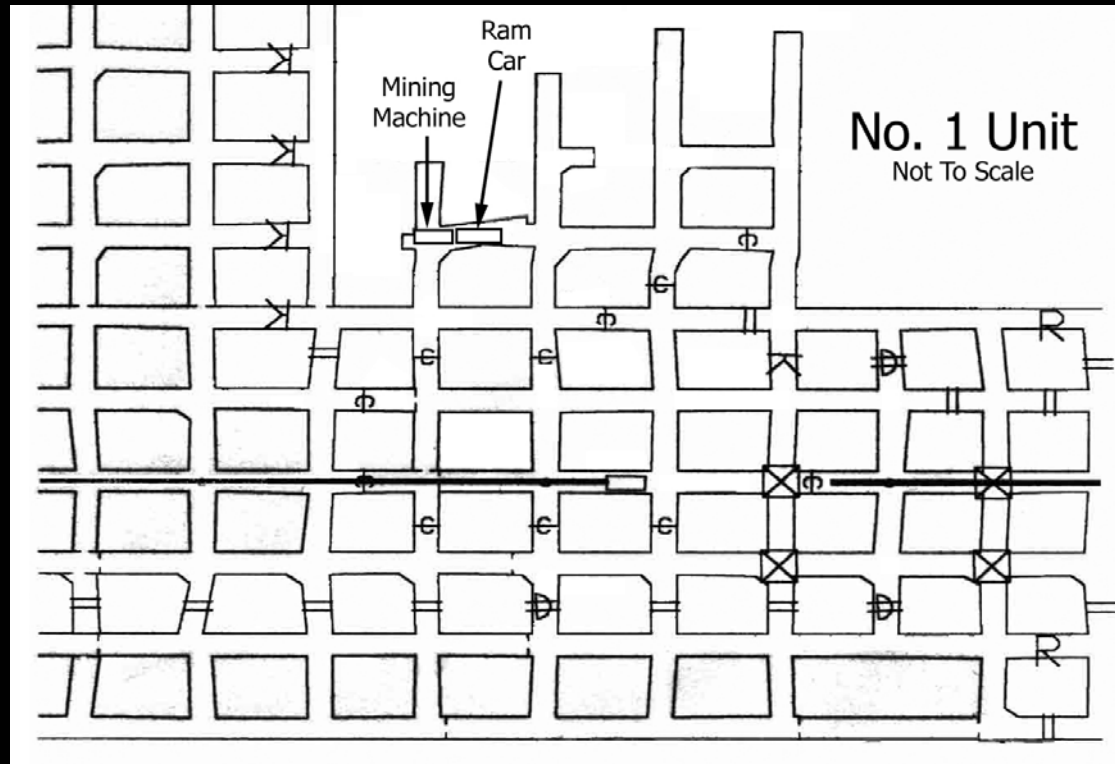
OVERVIEW

Coal Mine Fatal Accident 2003-20

- On July 2, 2003, a 49-year old continuous mining machine operator was fatally injured while mining coal from the left crosscut of the No. 2 entry on the No.1 unit.
- Approximately 18" into the cut, a carbonate nodule was encountered in the roof while mining the right side of the cut.
- A carbide tip had separated from one of the bits striking the nodule. As the damaged bit impacted the nodule, the bit body fragmented.
- A small piece of metal shrapnel from the fragmented bit body struck the mining machine operator's neck, causing severe, fatal bleeding.
- The root cause of the accident was lacking or missing procedures for safely mining when carbonate nodules are encountered.

ACCIDENT DETAILS

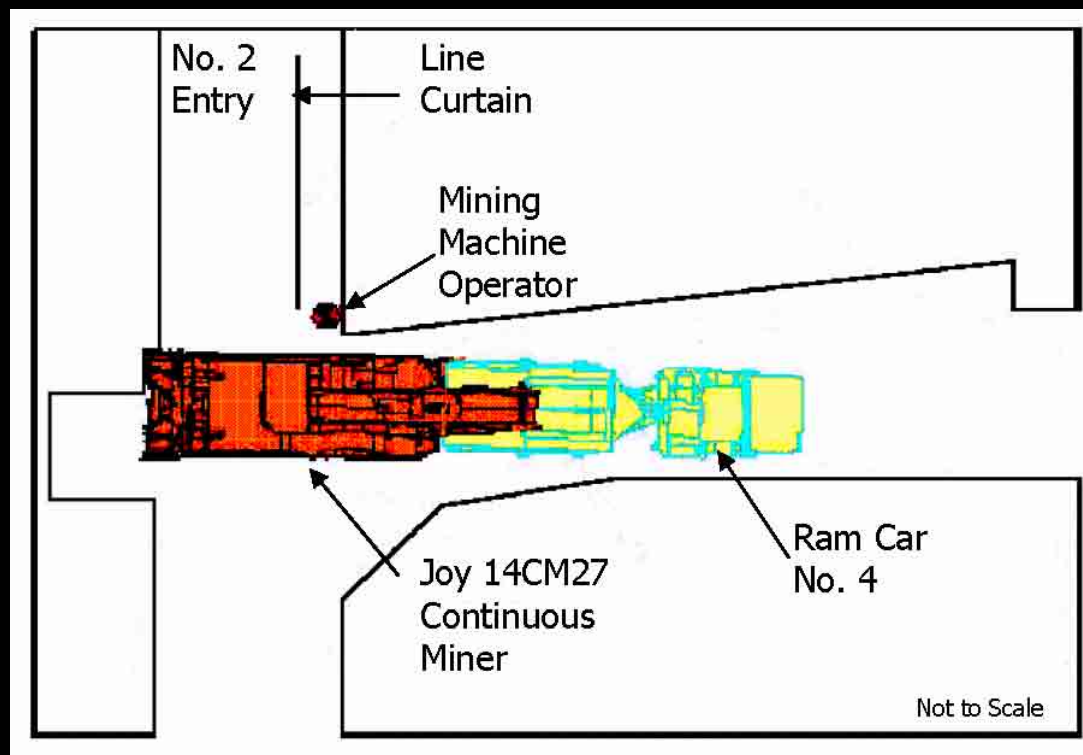
Coal Mine Fatal Accident 2003-20



- The No. 1 Unit crew started their shift, on July 2, 2003, at 7:00 a.m.
- The section foreman assigned specific work duties such as repairing ventilation controls and installing roof bolts.
- Production started at approximately 9:00 a.m.

ACCIDENT DETAILS

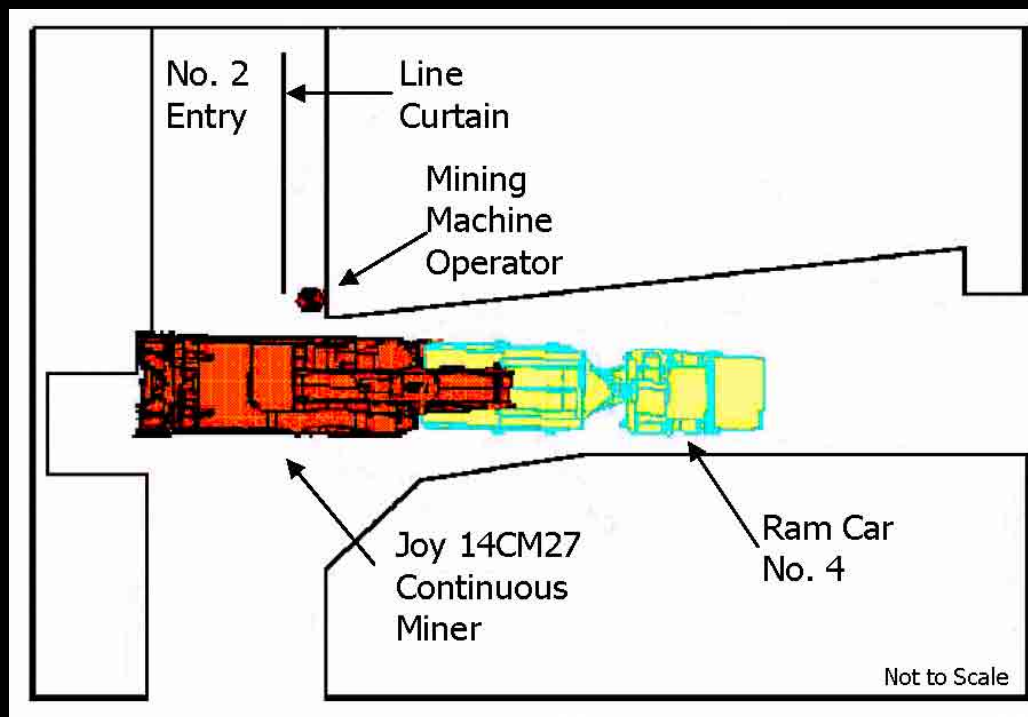
Coal Mine Fatal Accident 2003-20



- Coal was mined using a remote-controlled continuous mining machine with ram car haulage.
- At 3:15 p.m., the mining machine operator was positioned near the 2 Left intersection, to the right of his machine, as shown above.

ACCIDENT DETAILS

Coal Mine Fatal Accident 2003-20



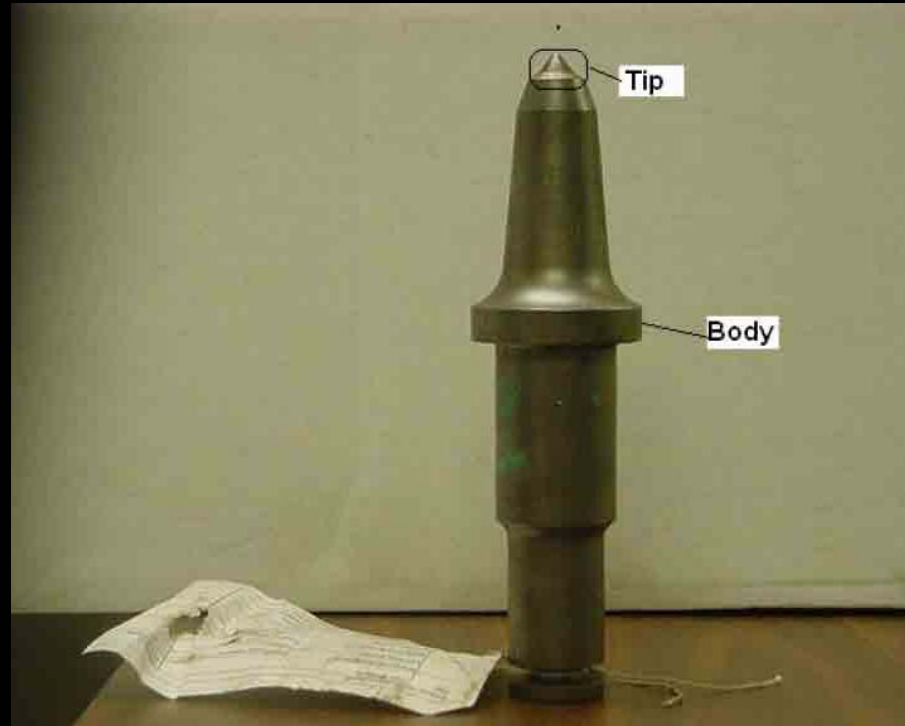
- 18" was mined from the right side lift.
- The ram car operator noticed the mining machine operator flinch.
- The mining machine operator grabbed his neck, walked to the ram car, stated he was bleeding, and collapsed.
- The ram car operator realized that the mining machine operator was seriously injured and summoned help.

ACCIDENT DETAILS

Coal Mine Fatal Accident 2003-20

- Blood was present on the right side of the victim's neck and he had no pulse.
- Direct pressure was applied to the victim's wound and CPR was immediately administered.
- The victim was transported to a medical facility where he was pronounced dead.

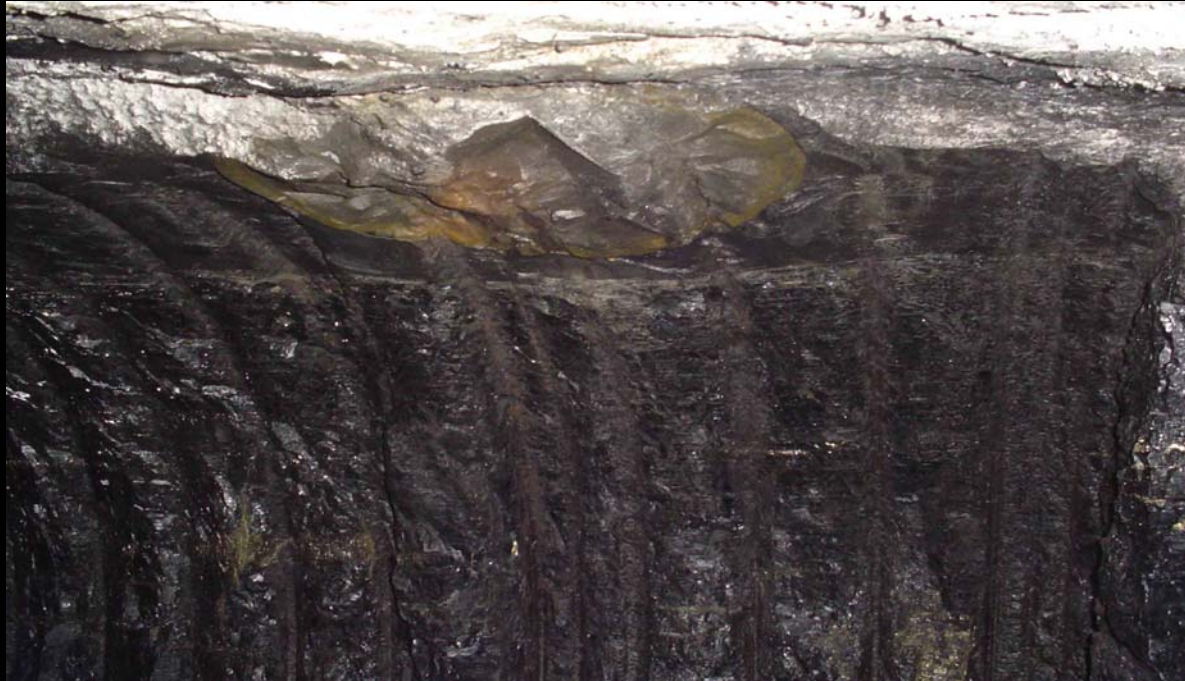
Coal Mine Fatal Accident 2003-20



- The mining machine was fitted with Kennametal U170 4.0 16s bits.
- A notice was attached to the bit container warning of the safety risk in using dull bits.
- There were 55 miner bits on the mining machine's cutting head.

PHYSICAL FACTORS

Coal Mine Fatal Accident 2003-20



- Numerous small carbonate nodules with extensive pyritic dissemination were encountered in the mine roof.
- These nodules are extremely hard to cut due to the density of their carbonate makeup.

PHYSICAL FACTORS

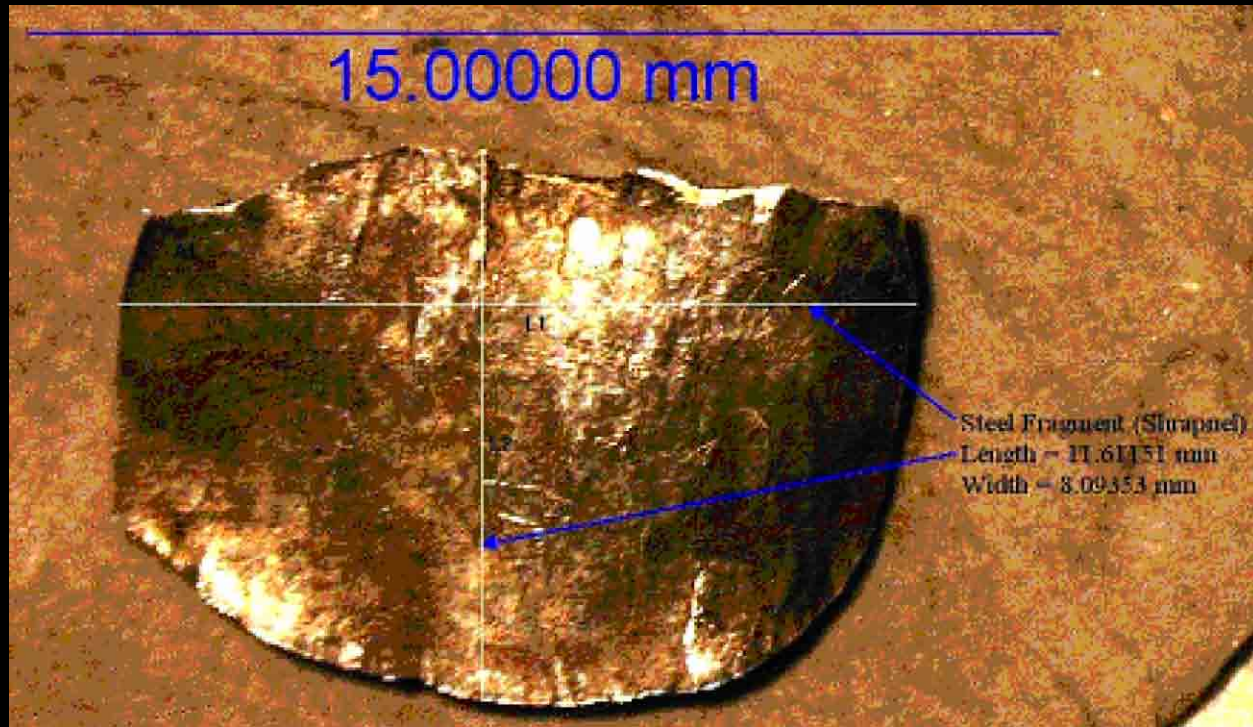
Coal Mine Fatal Accident 2003-20



- At the time of the accident the bits on the cutter head encountered a carbonate nodule in the mine roof.
- The bits contacting the carbonate nodules generated a significant amount of sparks.

PHYSICAL FACTORS

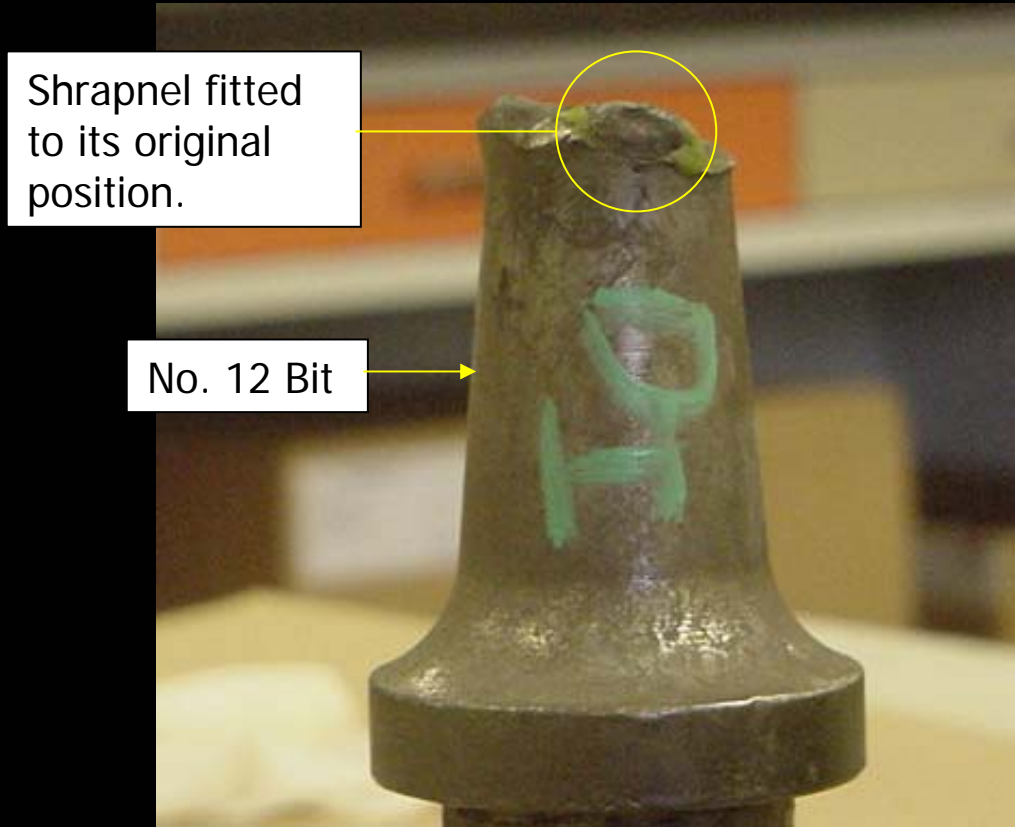
Coal Mine Fatal Accident 2003-20



- A piece of steel recovered from the victim's body was wedge-shaped, measuring 0.46" x 0.32" x 0.27" thick at the base tapering to a sharp edge.

PHYSICAL FACTORS

Coal Mine Fatal Accident 2003-20



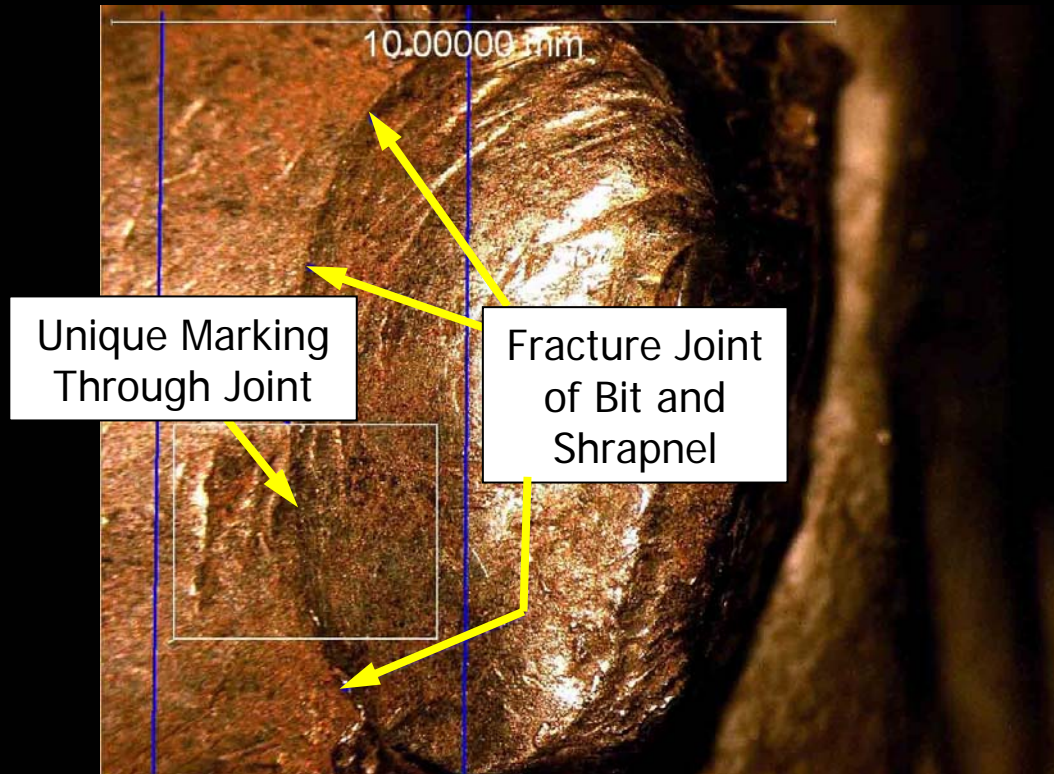
Shrapnel fitted to its original position.

No. 12 Bit

- The bit had lost its carbide tip during or prior to cutting through the large carbonate nodule on the right side of the lift.

PHYSICAL FACTORS

Coal Mine Fatal Accident 2003-20



- The material was found through microscopic evaluation to be from the body of the No.12 bit.

PHYSICAL FACTORS

Coal Mine Fatal Accident 2003-20



- The image shows the No. 12 bit, still located on the cutting head after the accident.
- The cutting head rotated approximately 59 times/minute.

ROOT CAUSE ANALYSIS

- **Causal Factor:** The presence of a carbonate nodule in the mine roof measuring roughly 14" in by 12" and numerous other small carbonate nodules with extensive pyritic dissemination were encountered in the mine roof.
- **Corrective Actions:** When carbonate nodules with extensive pyritic deposits are encountered in the mine roof the operator should first mine directly under the deposits to create a free face in attempt to jar the nodules loose.
- **Causal Factor:** The bit lost its tungsten carbide tip causing the steel bit body to come in contact with a carbonate nodule. The cutting bit body repeatedly impacted the carbonate nodule resulting in the shrapnel being generated.
- **Corrective Actions:** When adverse roof conditions of this nature are encountered, cutting bits should be visually examined prior to and frequently during the operation and replaced as necessary.

ROOT CAUSE ANALYSIS

- **Causal Factor:** The continuous mining machine operator was positioned within 19' of the working face.
- **Corrective Actions:** When adverse conditions exist such as mining roof-rock, and pyritic nodules, the mining machine operator should be positioned at as great a distance from the face as possible and appropriate PPE should be utilized.
- **Causal Factor:** The shrapnel struck the victim in the neck causing serious injury, which resulted in a fatality.
- **Corrective Actions:** Mining companies, manufactures, and other interested parties should continue research to develop personal protective equipment that will afford better protection for the miner and also identify proper machine and component configurations for such applications.

CONCLUSION

- The victim was fatally injured when a piece of shrapnel from a cutting bit struck him in the neck, causing severe bleeding. The shrapnel was generated by the breaking of a cutting bit as it struck a high-density carbonate nodule in the mine roof.
- The direct cause of the accident was breakage and fragmentation of the No.12 bit on the continuous mining machine's cutting drum as it impacted a carbonate nodule. Bits are not to be used when the tip (insert) is missing. The root cause of the accident was lacking or missing procedures for safely mining when carbonate nodules are encountered. These include the following when such conditions are present: undermining where possible; locating the operator farther from the machine; examining for and replacing broken bits more frequently; using personal protective equipment; ensuring the machine configuration is appropriate for the conditions.

ENFORCEMENT ACTIONS

There were no violations of Title 30 CFR that contributed to the fatal accident.

BEST PRACTICES

- **Inspect bits for wear or damage and replace them when either is observed.**
- **Ensure that all water sprays are operating properly to cool cutting bits, particularly when cutting rock.**
- **Evaluate equipment during repairs, removing any metal burrs and determining if further repairs are necessary when scraping of metals is obvious.**
- **Wear personal protective equipment at all times.**